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GEORGE MASSEE, F.L.S., F.R.H.S.

COPROPHILOUS FUNGI.

ABSTRACT.

from CHARLES CROSSLAND, F.L.S.

With Compliments
FUNGUS FORAY *Nov 28/01*

AT

CADEBY, MELTON,

SPROTBOROUGH,

AND

WARMSWORTH,

21st to 26th SEPTEMBER 1901.

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COPROPHILOUS FUNGI.

Abstract of Address delivered at Cadeby, 23rd September 1901, at the
Yorkshire Fungus Foray.

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Royal Herbarium, Kew; Chairman of the Yorkshire Mycological Committee.

NOTWITHSTANDING the close and continued attention paid to the Yorkshire Mycologic Flora during the past quarter of a century by members of the Y.N.U., much—very much—remains to be done even before we can assume that we possess a full knowledge as to the number of species indigenous to the county.

The above remark must not be interpreted as expressing my desire for a bald list of names, which would possess about the same value, and convey the same amount of information, as an enumeration of the number and relative positions of the telegraph posts doing duty in the county at any given moment. Furthermore, records on the authority of 'Anon' cannot be accepted; therefore the fact should be grasped that reproducing the same is worse than useless, inasmuch as it entails expense without any adequate return.

On the other hand, a list of fungi, accompanied by notes, enumerating the substratum—or, in the case of parasites, the host on which the fungus is growing—is of value not only to local people but to mycologists in every part of the world, as bearing on the interesting problem of parasite and host, and other questions of scientific and economic importance. It is the ambition on the part of the members of the Mycological Committee of the Union to attempt and their hope to succeed in presenting an account of Yorkshire fungi on the lines indicated above, to the readers of this journal in the near future.

Fungi requiring organic food, either in a dead or living form, naturally follow in the wake of the so-called higher plants, whose privilege it mainly is to supply such food; hence, at first sight it might be imagined that the geographical distribution of fungi would mainly depend on that of the plants furnishing the required food, and such to a great extent, especially in the case of parasitic fungi, appears to be the fact. Nevertheless there are many curious anomalies relating to the distribution of fungi that are as yet unexplained. It is difficult to account for the absence in England of *Amanita caesarea* Scop., a near ally of *Amanita muscaria* L., from which it differs in having yellow gills, and more especially

in being edible, its qualities in this respect being such that an old author has described it as being food for the gods. This fungus occurs in France, Germany, in fact extends quite across Europe, and is also met with in North America and India, high up on the Himalayas. Numerous similar problems could be given relating to large species of fungi that could scarcely be overlooked.

Finally, most of all yet remains to be done in the important section of work dealing with the why and wherefore of the existence of fungi; the causes that led up to parasitism; tracing the genetic relationship between the various forms constituting an entity in the species of Uredineæ, etc. Much work bearing on these problems can be done best in the field, or at all events field work carefully and systematically carried out often suggests problems that are afterwards cleared up in the laboratory.

As a single example—a French mycologist had observed in the field that certain fungi were constantly eaten by slugs, whereas other equally abundant species were never eaten by mollusks. He further noted that in certain species it was always the stem that was eaten, whereas in others the pileus was the part constantly preferred. Further research revealed the fact that the presence of one or more forms of sugar was present in all the species eaten by slugs and snails, and that the location of these substances in the stem or pileus respectively determined the portion to be eaten.

The main object of this talk, which has been delayed thus far, is to intimate to members of the Union that a hitherto comparatively unworked field of research requires attention. I allude to Coprophilous, or dung-borne fungi.

Now it is just probable that there will be a feeling of repugnance at the idea of the very close contact with dung necessary for the detection of very minute fungi. This, however, is purely a matter of sentiment, and is soon waived aside when once the study is entered upon in real earnest.

Continental mycologists have been much more industrious than ourselves in prosecuting this special branch of study, and it may perhaps be as well to state that the little that is known of the occurrence of these minute organisms in this country has been done outside Yorkshire. This is not quite what one would wish, and it rests mainly with the members of the Union to reverse the statement.

That there is work to be done in this direction is proved by the fact that, due to the discovery of an interesting fungus on rabbit dung, collected in Mulgrave Woods during our last

Fungus Foray, the subject was followed up, and in addition to a careful examination of dung of different indigenous and domestic animals from different parts of Great Britain, the dung of many exotic animals—Lion, Hyæna, Bear, Kangaroo, Ostrich, Crocodile, etc., etc., was also examined, thanks to the kindness of Mr. Bartlett, Superintendent of the Zoological Gardens, Regent's Park.

The outcome of this work is, in the first place, the addition of about fifty species to the British Mycologic Flora; many of these were already known on the Continent, others, both genera and species, proved to be new to science.

Representatives of all families of fungi grow on dung, and a very interesting feature is the fact that in many instances the most primitive forms of the different groups occur on this substratum.

In the Agaricaceæ, or gill-bearing fungi, we meet with the most primitive types of the black-spored species of *Coprinus*, characterised by the deliquescent gills. Again, in the Ascomycetes, the primitive forms included in the order Gymnoascaceæ are by no means uncommon, and, although very minute, are in many instances very beautiful, the numerous asci or spore-containing cells being surrounded by a more or less loose mesh of threads, bearing outgrowths of fantastic forms, the use of which is at present problematical.

This habit of growing on dung is an acquired one, inasmuch as representatives of some of the families of fungi growing on dung at the present day existed long before the advent of warm-blooded, herbivorous animals, on the dung of which most fungi occur. According to statistics given elsewhere,* 708 species of fungi grow on the dung of herbivorous animals, 45 species on that of carnivorous animals, whereas only four species occur on the dung of reptilia. Seventy-four species of fungi are known to grow on rabbit dung.

One feature common to many coprophilous fungi is that the spores are provided with a certain amount of a transparent gelatinous substance adhering to their surface. This mucilage may appear under the form of tail-like appendages attached to one or both ends of the spore, or the entire surface of the spore may be covered with a thick layer of the same substance. The use of this peculiar mucilage is as follows:—In *Thelebolus stercorea* Tode, various species of *Ascobolus*, *Xylaria*, and others,

* 'Researches on Coprophilous Fungi,' Geo. Massee and E. S. Salmon;

'Annals of Botany, 1861, p. 313, 3 plates.

1901 November 1.

the spores are ejected or shot out of the ascus to some distance when mature. Such spores often alight on blades of grass growing near the dung on which they are produced, and on coming into contact with the air the mucilage surrounding them almost immediately sets hard and is insoluble in water, hence the spores are not washed to the ground by rain, but remain firmly glued to the grass on which they alighted. Much of this spore-infected grass is eventually eaten by herbivorous animals, and in this way the spores find their way into the alimentary canal, where they commence to germinate, and after the dung is deposited produce fruit within a few days, shoot out their spores in due course, which are again swallowed along with the grass on which they alight, and thus herbivorous animals in every portion of the globe unconsciously assist in the distribution of these minute but beautiful organisms. Spores of coprophilous fungi found on dead grass that had remained throughout the winter lying on the ground were found to germinate readily after passing through the intestinal canal of a guinea-pig, and it is probably from such over-winter spores that the first crop of these fungi are produced in the spring. The large shipment of hay and forage of various kinds from one part of the world to another will in all probability assist in the distribution of coprophilous fungi; in fact, judging from the occurrence of many of our common British species in most of our colonies, it may fairly be assumed that this factor has already been at work.

FUNGUS FORAY

AT CADEBY, MELTON, SPROTBOROUGH, AND WARMSWORTH.

CHARLES CROSSLAND, F.L.S..

Halifax; Hon. Sec. Yorkshire Mycological Committee.

THE tenth annual gathering of the Yorkshire Mycological Committee consisted of a six days' Foray (21st-26th September) in the Cadeby, Melton, Sprotborough, and Warmsworth districts of South Yorkshire. These places lie on the high grounds partially overlooking the valley of the Don in the vicinity of Conisborough. The headquarters were fixed at the little farm-village of Cadeby, situate on the top of the hill, about a mile north of, and not easily accessible from, the ancient 'King's Stronghold.' Visitors had to run the gauntlet through a pit-yard and tunnel path, or cross a ferry below the castle, the hill being to climb in both cases. When once there, however, Cadeby formed a convenient centre from which to work the woods and parks for which permission to investigate had been obtained by the Hon. Secretaries of the Union, with the able assistance of Mr. M. H. Stiles and Mr. H. H. Corbett. These gentlemen had also secured a commodious house at the top of the village, containing large dining and work rooms, which afforded ample space for carrying on the indoor portion of the Foray.

The members of the Mycological Committee who took part in the investigations were Messrs. G. Masee, F.L.S., F.R.H.S., Royal Herbarium, Kew (President Mycological Committee); A. Clarke, Huddersfield; J. Williams Sutcliffe, Halifax; Thos. Gibbs, Sheffield; C. H. Broadhead, Thongsbridge; and the Secretary. There were also present Messrs. J. H. Holland, F.L.S., Royal Herbarium, Kew; Thos. Hey, Derby; and W. H. Cooke, Halifax. Several of the Committee were unable to attend. Mr. Thomas Birks, Eaglescliffe Junction, and Mr. W. N. Cheeseman, Selby, joined the general Excursion on the Thursday, when some interesting species were added to the list. The unavoidable absence of Mr. James Needham, Hebden Bridge, who on all occasions has proved himself to be a most indefatigable collector, particularly of micro-species, was specially regretted. Mr. Clarke and the writer visited the district the previous week-end so as to become more familiar with its bearings.

Considering the long-continued dry weather, the number of species collected was fairly satisfactory. The rains of the previous few days came just in time to waken up many of the smaller and more delicate kinds and give them a start: a heavy shower on the Monday afternoon tended in the same direction. The larger and more fleshy species could not respond so readily as the little ones. There was not a single *Amanita* found, not even *A. rubescens*; and only a solitary *Boletus* (*B. viscidus* L.) *Armillaria mellea* and *Pholiota mutabilis* are not so dependent on moist weather if the former can insinuate itself into the cambium layer of a living tree, and the latter lodge itself in a stout old stump. Of both these there were plenty in Pot-ridings Wood, *Armillaria mellea* in an almost endless variety of forms.

The woods visited varied much in shade and moisture. Warmsworth was a failure. A naturally moist hollow in Pot-ridings Wood, between the railway and Sprotborough Bridge, proved very prolific ground. The living trees were mostly Hazel and Elder, and made good shade. Several scattered heaps of dead boughs and branches, the remains of removed timber trees, were lying about; these were rich in fungi of many kinds. The beautiful *Poria sanguinolenta* literally covered one piece to the extent of 5 or 6 feet; one feature of interest connected with this cream white polypore is that it immediately becomes blood red in places where it is in the least bruised, or even touched. Thirteen of the sixteen *Mycenæ* met with were found here, *M. hæmatopoda*, *M. galopoda*, and *M. filipes* in quantity. *M. Berkeleyi* Mass. (= *M. excisa* Berk.) was here, but this fine well marked species, noted for the greatly extended sinus in the gills, was represented by only a couple of sporophores. Here also was the strong-smelling, white *Lepiota* (*L. Bucknalli* B. & Br.), which is anything but common; *L. cristata* in plenty; *L. Friesii* and *Chlorospora Eyrei* Mass. Mr. Massee writes:—

In point of rarity, and more especially from the geographical standpoint, perhaps the most interesting discovery made was that of *Chlorospora Eyrei* Mass. (= *Schulzeria Eyrei* Mass.), as being the only European representative of the section *Chlorosporæ* of the Agaricineæ, characterised by having distinctly green gills and spores. The headquarters of the *Chlorosporæ* is in the New World, where the species range from Brazil to the United States. *Chlorophyllum esculentum* Mass., an esculent fungus, having pea-green gills and spores, and a pileus 6-8 inches across, is not uncommon in British Guiana.

Chlorospora Eyrei was discovered some years ago in Hampshire by the Rev. W. L. W. Eyre, after whom it was named. It is a *Lepiota* looking fungus, having a whitish pileus about 1 inch across, and bluish-green gills, calling to mind the colour of the pileus of *Stropharia æruginosa*. The green colour of the spores, when collected on white paper, is quite as decided as that of the gills.

The discovery of a green-spored group of Agarics is of exceptional interest, as illustrating the extension of a biological feature in the evolution of the Agaricineæ, respecting the significance of which nothing is at present known.

As is well known, the large assemblage of Agarics is divided into five primary groups, depending on the colour of the spores, i.e., black, purple, brown, pink or salmon-colour, and white. In each of these colour-groups of Agarics there is an exact repetition of the same sequence of morphological details; thus, in each group we find species furnished with a volva at the base of the stem, whereas others in each group are destitute of this structure. Some representatives of each group have the gills quite free from the stem, whereas in others the gills are grown to the stem, etc., etc. Consequently, but for the difference in the colour of the spores, and judged from a morphological standpoint only, representatives from the five colour-groups would be placed in one and the same genus, as was indeed done by Fries in his earlier works.

This point of interest, illustrated by the *Chlorosporæ*, is the fact that we find some genera included in the old colour-groups, showing a tendency to follow in the same line of becoming differentiated into colour-groups.

In the genus *Lepiota*, a member of the white-spored group, the structural features are free gills, and presence of a general and a secondary veil, forming, when fully expanded, a volva at the base of the stem, and a ring or annulus also on the stem. In the genus *Schulzeria*, a split-off from *Lepiota*, the ring is absent from the stem.

Now the two genera constituting the *Chlorosporæ*—*Chlorospora* and *Chlorophyllum*—agree morphologically with *Lepiota* and *Schulzeria*, differing only in the green gills and spores. Other members included in the old genus *Lepiota* have decidedly ochraceous spores. Other genera included in the old colour-groups, as *Pleurotus*, *Tricholoma*, etc., also show a decided tendency to vary the colour of their spores, while retaining their morphological features.

There is a considerable amount of evidence in favour of the supposition that the most primitive section of Agarics, as *Coprinus*, etc., had dark-coloured spores, and that the sequence of evolution of the various colour-groups passed respectively from black, through purple, brown, and pink, to white. During this sequence of evolution certain other features of advantage were evolved as superior means of spore dispersion, protective features, etc.

Is it possible that, having secured the advantages mentioned, along with others, that a retrogression in favour of coloured spores, which may have some value when combined with the other advantages previously acquired, is in progress? It may be added that all the genera showing a tendency to form a new series of colour-sections of spores, belong to the most highly organised or white-spored section of Agarics.—G. M.

Some very striking object lessons illustrating plant diseases caused by fungi were observed in both Melton and Potridings Woods. In the former the Birch trees have suffered severely from the attacks of the Birch-tree Fungus (*Polyporus betulinus*), many of them being killed outright long before reaching their prime. Numerous great chunks of the fungus were to be seen which had been allowed to develop and propagate a new generation of disease. Certainly a dead Birch-trunk bearing several large specimens of this fungus is a most interesting object from an artistic point of view, a fact duly recognised by Mr. A. Clarke, who devoted considerable attention to these and other effective groups of fungi, illustrations of which will, in due time, supplement the already extensive and unique collection of stereophotographs of fungi possessed by this enthusiastic mycologist. In other places *Fomes annosus* Fr. (= *Trametes radiciperda* Hartig) was specially abundant, but will probably soon be rarer in the district, as the great majority of conifers are already infected; *Sequoia gigantea* was in one instance observed to be attacked by this fungus. The Larches were fairly free from the destructive *Peziza Dasyscypha calycina* = *P. Wilkomii*. One or two cups only were found on a fallen twig. Nearly all the Yew trees in the district were attacked by *Sphaerella taxi* Cooke. Many trees had been killed by this parasite, which infests the leaves, others were more or less injured; some of those in the churchyard at Cadeby had been severely pruned back in the hope of getting rid of the unwelcome pest, but without avail. On careful examination the ascospores of *Sphaerella taxi* prove to be 3-septate, hence the species must stand in future as

Sphaerulina taxi (Cke.); in the genus *Sphaerella*, as understood at the present day, the spores are 1-septate.

In a damp corner of Potridings Wood a large patch of Ground Ivy (*Glechoma hederacea*) illustrated very clearly the meaning of an epidemic caused by a parasitic fungus, nearly every leaf showing several chalk-white blotches caused by a minute mould *Ramularia calcea* Cesati. Parasitic moulds, mainly *Erysiphe*, were very prevalent throughout the district. They were seen on *Arctium lappa*, *Polygonum aviculare*, *Acer*, *Circaea lutetiana*, *Heracleum sphondylium*, *Hypericum hirsutum*, *Trifolium repens*, *T. pratense*, and *Alchemilla vulgaris*. Some special moulds even attack other fungi, especially Agarics; every specimen of *Clitocybe fragrans* looked at was the host of *Sporodinia aspergillus* Schrœt. = *Syzygites megalocarpus* Cke.

Special attention was paid to host plants and habitats of fungi observed for the purpose of recording in the 'List of Yorkshire Fungi,' in course of preparation for publication.

In Melton Woods about a dozen specimens of *Tricholoma leucoecephalum* were found growing clean through the flattened remains of a dead Hedgehog. They were exclusively confined to this small area, and were in all stages of development. Presumably this covering had favoured the germination of the spores in the ground beneath and helped on the formation of a succeeding generation of basidiophores.

Permission had been obtained to visit Edlington Woods, but so much attention was given to searching for micro-species that time was not available. Micro-material was found in sufficient quantity to keep four microscopes in full employ in its examination during the evenings and early mornings. Much of it required attending to with as little delay as possible.

Several novelties were found in a heap of decaying grass near Cadeby. One new to science—*Sphaeroderma giganteum* ⁺ Mass. & Crossl.; *Chaetomium murorum* Wint.; and *Arachnomycetes nitidus* Mass. & Salm. ⁺ The latter species is the type of a new genus discovered at Kew by G. Masee and E. S. Salmon, some short time ago, the diagnosis of which is in the printers' hands at the present time.

The rabbits' dung wherever it was seen was plentifully pitted and decorated with numerous species of fungi of one kind or another, though very often *Stilbum fimetarium* monopolised the whole pellet. This dung yielded a fine specimen of *Poronia* ⁺ *leporina* Ellis & Everhardt. This species is new to the European Flora, being previously only known from the United States,

where it occurs on the matrix mentioned above. A very distinct species characterised by the prominent scattered perithecia and the small spores.

- † Other species, new to Britain, are *Stilbum leiopus* Ehrh., discovered by Mr. Hey, on the dung of the wood-mouse, just within the boundary wall at the bottom of Scabba Wood, and
 † *Helotium tumidulum* (Rehm) on fallen oak leaves, Conisborough Castle moat, by Mr. Gibbs.

These new finds at almost every Fungus Foray prove very plainly what an immense amount of work still remains undone in Britain. We ask ourselves the question: if a few new things can be brought to light at each pop-visit, what can be done by constant and persistent investigation the year round in suitable places? Fungi must abound, or 430 species could not have been found at Mulgrave Woods last year, in three or four days, within an area of much less than a square mile. The Royal Gardens, Kew, afford an example of continued work over a lengthened period. There, within an area of less than 300 acres, the Mycological Flora up to 1897 consisted of 337 genera and 1,340 species (Kew Bulletin, 1897, G. Masee). Allowing for a few introduced species, a good total remains. Again, the abstract of Mr. Masee's lecture on dung fungi shows what has been done in a single season in that direction. Persistent investigation is the method adopted by mycologists of other countries, and that accounts to a large extent for the great gaps we have in Britain in the sequence of genera and species of known fungi.

On the Monday evening, Mr. Masee gave a most instructive and interesting lecture on 'Coprophilous Fungi,' an abstract of which appears in this number. He also gave an extra one on 'Plant Diseases,' for the special benefit of one or two professional gardeners present. Each was illustrated by a fine series of drawings, strung on wires round the workroom.

Mr. Clarke's highly valuable series of stereo-photos were much admired.

Taken altogether, this has been one of the most successful and pleasant of Forays the Union has yet held. The weather was favourable for searching the woods if not for producing 'piles' of big fungi.

The business meeting was held on the Wednesday evening. Officers and Committee were re-elected, with the addition of Mr. C. H. Broadhead, Wooldale, Thongsbridge. It was decided to recommend Arncliffe Woods, near Whitby, for next year's Foray, to be held 27th September and following days.

In drawing up the list of species found, the arrangement of genera, as laid down by Professor Saccardo in his 'Tabulæ

Comparativæ Generum Fungorum Omnium' has been followed. With a view to make it of more scientific value, the host or habitat of each species is given.

The finds for each locality have been kept separate. The abbreviations of names of localities are:—C. = Cadeby; M. = Melton Woods; W. = Warmsworth; P. = Potridings Wood, near Sprotborough; S. = Sprotborough.

BASIDIOMYCETÆ.

(GASTROMYCETÆ.)

NIDULARIACEÆ.

Cyathus Haller.

C. vernicosus DC. C., M.

On road-scraping heaps.

Crucibulum Tul.

C. vulgare Tul. C., M., P.

On fallen branches.

Sphærobolus Tode.

S. stellatus Tode. C., M., W., P.

On rotten wood in moist places.

LYCOPERDIACEÆ.

Lycoperdon Tournf.

L. gemmatum Batsch. M., W.

On the ground.

L. pyriforme Schæff. C., M., W., P., S.

On the ground and on rotten wood.

Bovista Dill.

B. nigrescens Vitt. P.

In pasture.

PHALLACEÆ.

Ithyphallus Fr.

I. impudicus Linn. M., P.

On the ground.

Mutinus Fr.

M. caninus Fr. W.

On soil- and moss-covered tree stump.

(HYMENOMYCETÆ.)

AGARICACEÆ.

Agaricæ.

Chlorospora Mass.

C. ~~Eyrei~~ Mass.

= Schulzeria Eyrei Mass. P.

On the ground among decaying twigs.

Lepiota Fries.

L. procera Scop. C.

In field.

L. Friesii Lasch. P.

On ground in woods.

L. hispida Fr. P.

On the ground in woods.

L. cristata A. & S. M., P.

Among grass, margin of wood.

L. excoriata Schff. S.

On the ground.

L. Bucknalli B. & Br. P.

On the ground among decaying twigs.

Armillaria Fries.

A. mellea Fl. Dan. C., M., W., P.

In clusters about stumps and the base of living tree trunks; also solitary and scattered.

Tricholoma Fries.

T. rutilans Schff. M.

On the ground among rotten branches in a mixed wood.

T. terreum Schff. M.

On the ground.

T. carneum Bull. C.

In pasture.

T. leucephalum Fr. M.

Growing through the flattened remains of a dead Hedgehog.

T. personatum Fr. C.

In pasture.

T. nudum Bull. P.

On the ground.

T. melaleucum Pers.

var. porphyroleucum Fr. P.

On ground in the wood.

Clitocybe Fries.

C. fragrans Sow. P.

On the ground in wood. Every basidiophore seen was attacked by the parasitic mold Sporodinia aspergillus.

Laccaria B.&Br.

L. laccata B.&Br. M.

On the ground in wood.

Collybia Fries.

C. radicata Fr. P.

About old stumps, penetrating deeply by a tough, gradually tapering root.

C. maculata A.&S. C., M., P.

Among grass in woods.

C. butyracea Bull. M., P.

Among grass and dead leaves.

C. velutipes Curt. S.

On trunk.

C. confluens Pers. P.

On soil among dead leaves.

C. tuberosa Bull. M., P.

In woods, on the ground among decaying twigs, etc.

C. nummularia Fr. M., P.

Among decaying grass and leaves.

C. acervata Fr. M.

On fallen pine-log.

C. dryophila Bull. M.

Among decaying leaves.

C. ambusta Fr. C.

On scorched ground among the charred remains of burnt branches.

Mycena Fries.

M. puſa Pers. P.

On ground, margin of wood.

M. Berkeleyi Mass. P.

On rotting branches.

M. rugosa Fr. P.

On stump.

M. galericulata Scop. C., M., W., P.

On stumps.

Var. calopoda Fr. P.

M. polygramma Bull. M.

Near stump.

M. ammoniaca Fr. P.

On the ground among rotting wood.

M. filipes Bull. M., P.

Among decaying leaves.

M. acicula Schff. M., P.

On rotten wood.

M. hæmatopoda Fr. M., P.

On decaying branches.

M. sanguinolenta A.&S. C., M., P.

On the ground among dead leaves, etc.

M. galopoda Fr. C., M., W., P.

In woods, on the ground.

M. vulgaris Pers. M.

On and about rotten twigs.

M. discopoda Lévl. M.

On dead twigs.

M. setosa Sow. P.

Among fragments of dead leaves.

M. capillaris Schm. P.

On dead beech leaves.

Omphalia Fries.

O. picta Fr. P.

On decaying twigs.

O. grisea Fr. M.

On the ground in wood.

O. integrella Pers. P.

Pleurotus Fries.

P. ulmarius Bull. C.

On fallen trunk.

P. pantoleucus Fr. P.

On fallen bough.

P. mitis Pers. M.

On bark.

P. septicus Fr. C.

On dead branch.

Pluteus Fries.

P. cervinus Schff. C., M., W., P., S.

About old stumps.

P. chrysophæus Schff. P.

On dead wood.

P. phlebophorus Dittm. P.

On decaying stump.

Nolanea Fries.

N. pascua F. S.

In meadows.

Eccilia Fries.

E. atro-puncta Pers. P.

On the ground in woods.

Pholiota Fries.

P. ombrophila Fr. M.

P. togularis Bull. C.

On the ground.

P. squarrosa Müll. M.

On stump.

P. mutabilis Schff. P.

In great clusters about old stumps.

Inocybe Fries.

I. dulcamara A.&S. P.

In mixed woods.

I. echinata Roth. P.

In mixed woods.

Inocybe asterospora Quelet. M.

On the ground.

I. geophylla Sow. P.

On the ground.

Flammula Fries.

F. carbonaria Fr. C.

On charred stump.

F. sapinea Fr. M.

On heathy ground.

Galera Fries.

G. tener Schff. C., M., W., P., S.

On the ground.

G. sparteae Fr. C.

In meadow.

G. hypnorum Batsch. M.

Among moss.

Tubaria Fries.

T. furfuracea Pers. C., M., P.

On the ground in woods.

Cortinarius Fries.

C. pennicillatus Fr. P.

Agaricus Linn.

A. arvensis Schff.

Common.

A. campestris L.

Common in almost all the fields.

A. hæmorrhoidarius Kalch. S.

In park.

A. sagatus Fr. P.

In wood.

Stropharia Fries.

S. æruginosa Curt. M.

In moist shady place in the wood.

S. stercoraria Fr. C.

On cow dung in pasture.

S. semiglobata Batsch.

Common on cow and horse dung in pastures.

Hypholoma Fries.

H. sublateralitium Schff. M., P.

On stumps.

H. fasciculare Huds. C., M., W., P.

On stumps.

Var. **elæodes** Bull. C.

Panæolus Fries.

P. phalænearum Fr. S.

On dung in pasture.

P. campanulatus L. S.

On dung in park.

Anellaria Karst.

A. separata L. S.

On dung in pastures.

Psilocybe Fries.

P. semilanceata S.

In pasture.

P. spadiceo-grisea Schff. M.

Near decaying stump.

P. foenisecii Pers. C., S.

In pasture.

Psathyra Fries.

P. conopilea Fr. M., P.

On the ground, margin of wood.

P. pennata Fries. P.

On rich soil.

Psathyrella Fries.

P. gracilis Fr. C., M., P., S.

Grassy places in the woods.

P. disseminata Pers. C., M., W.

In thousands, covering old stumps.

P. atomata Fr. C.

Among grass in wood.

Coprinus Fries.

C. comatus Fr. C.

By road side.

C. atramentarius Fr. C., M., P., S.

On the ground in woods, and moist open places.

C. niveus Pers. C.

On rich, loose soil.

C. micaceus Bull. C., M., W., P., S.

On decaying stumps.

C. lagopus Fr. C.

On rich, loose soil.

C. radiatus Bolt. C., M., P.

On horse dung.

C. sociatus Fr. C., M.

Among grass.

C. plicatilis Curt. C., M., W., P.

In pastures.

Paxilleæ.

Hygrophorus Fr.

H. conicus Scop. S.

In pastures.

H. psittacinus Schff. S.

In pastures.

Paxillus Fr.

P. involutus Batsch. M., P.

Lactariææ.

Lactarius Fries.

L. torminosus Schff. M.

L. turpis Weinm. M.

L. pyrogalus Bull. P.

L. pallidus Pers. P.

L. glyciosmus Fr. P.

L. subdulcis Bull. M.

All on the ground in the woods.

Russula Fries.

R. adusta Pers. M.

R. delica Fr. M.

R. cyanoxantha Schff. M.

R. granulosa Cooke. M.

R. fragilis Fr. M.

R. ochroleuca Pers. M.

All on the ground in and near the woods.

Marasmiæ.

Marasmius Fries.

M. peronatus Bolt. P.

Among dead leaves.

M. oreades Bolt. C., M., W., P., S.

In rings in the pastures.

M. erythropus Fr. P.

On the ground in wood.

M. ramealis Bull. M., P.

On twigs.

M. rotula Scop. C., M., W., P.

On twigs.

M. androsaceus L. C., M., P.

On leaves, etc.

Panus Fries.

P. torulosus Fr. M.

On tree trunk.

P. stypticus Bull. M.

On fallen trunk.

POLYPORACEÆ.

Boleteæ.

Boletus Dill.

B. viscidus L. M.

On the ground.

Fistulina Bull.

F. hepatica Fr. C.

On oak stump.

Polyporeæ.

Polyporus Mich.

P. squamosus Fr. C., M., W.

On *Ulmus montana* at Melton.

P. giganteus Fr. M.

On stump.

P. sulphureus Fr. M., W.

On Yew at Warmsworth.

P. alligatus Fr. P.

On fallen trunk.

P. betulinus Fr. C., M.

P. mollis Fr. P.

On fallen boughs.

P. chioneus Fr. M., P.

On fallen boughs.

P. armeniacus Berk. P.

Polystictus Fr.

P. versicolor Fr. C., M., W., P., S.

On stumps.

P. hirsutus Fr. M., P.

On stumps.

Fomes Fries.

F. ulmarius Fr. M., P.

F. igniarius Fr. C., M.

Both on fallen wood.

F. annosus Fr. M.

Parasitic on conifers.

F. ferruginosus Fr. M.

On fallen wood.

Poria Fries.

P. vaporaria Fr. M., W., P.

P. blepharistoma B.&Br. M., P.

P. obducens Pers. P.

P. sanguinolenta A.&S. P.

All on fallen wood.

Dædalea Fries.

D. latissima Fr. P.

On dead branch.

HYDNACEÆ.

Hydnum L.

H. alutaceum Fr. P.

H. viride Fr. P.

H. nodulosum Fr. P.

H. niveum Pers. P.

Grandinia Fr.

G. granulosa Fr. M., P.

Odontia Pers.

O. fimbriata Pers. P.

All on fallen wood.

CLAVARIACEÆ.

Clavaria Vaill.

C. cristata Holmsk. M.

On the ground.

C. rugosa Bull. M.

On the ground.

C. abietina Schum. M.

On pine leaves.

Pistillaria Fries.

P. puberula Berk. W.

On decaying leaves.

THELEPHORACEÆ.

Stereum Pers.

S. hirsutum Fr. C., M., W., P., S.

S. sanguinolentum Fr. M.

S. rugosum Fr. M., P.

S. spadiceum Fr. M., P.

All on fallen wood.

Corticium Fr.

C. porosum B. & Curt. M.

C. calceum Fr. P.

C. arachnoideum Berk. M.

On fallen branches.

C. sambuci Fr. P.

On dead Elder.

C. comedens Fr. P.

On living Hazel.

Peniophora Cooke.

P. ochracea Mass. M.

P. cinerea Cke. M., P.

On dead branches.

Soppitiella Mass.

S. sebacea M. P.

Encrusting twigs, grass, etc.

Cyphella Fries.

C. albo-violescens Karst. P.

On chips.

Thelephora Pers.

T. laciniata Pers. M.

On the ground.

TREMELLACEÆ.

Auriculariæ.

Hirneola Fries.

H. auricula-judæ Berk. C., M., P.

On living Elder branches.

Tremelleæ.

Exidia Fries.

E. albida Brefeld. M., P.

On branches.

Dacryomycetæ.

Dacryomyces Nees.

D. deliquescens Duby.

Common. C., M., P., S.

D. stillatus Nees. M., P.

On worked wood: rails, etc.

Protoclavariæ.

Calocera Fries.

C. viscosa Fr. M., P.

C. cornea Fr. C., M., P., W.

C. stricta Fr. M.

All on decayed decorticated wood.

UREDINACEÆ.

Puccinæ.

Uromyces Link.

U. polygoni (Pers.). C.

On *Polygonum aviculare*.

Puccinia Pers.

P. menthæ Pers. M.

On *Mentha arvensis*.

P. suaveolens (Pers.). P.

On *Carduus arvensis*.

P. malvacearum Mont. S.

On *Malva*.

USTILAGINACEÆ.

Ustilago Pers.

U. violacea (Pers.). C.

On anthers of *Lychnis diurna*.

Tilletiæ.

Urocystis Rabh.

U. anemones (Pers.). P.

On leaves of *Ranunculus repens*.

ASCOMYCETÆ.

(**PYRENOMYCETÆ.**)

PERISPORACEÆ.

Erysipheæ.

Sphærotheca Lévl.

S. humuli (DC.) Bun. P.

On *Alchemilla vulgaris*.

S. pannosa (Wallr.) Lévl. M., P.

On *Rosa*.

Erysiphe Hedw.

E. polygoni DC.

On *Anthriscus sylvestris*. W., P.

Circæa lutetiana. P.

Hypericum hirsutum. M., P.

Trifolium repens. C., M.

T. arvense. P., W.

E. taurica Lévl. C., M., P., W.

On *Arctium lappa*.

Eurotiæ.

Arachnomycetes Masee & Salmon.

A. nitidus M. & S. C.

On decaying grass.

SPHÆRIACEÆ.**Sphærelleæ.****Sphærella** C.&DN.

S. rumicis Desm. C., M., W.
On *Rumex acetosa*.

Sphærulina Sacc.

S. taxi (Cke.). C., M.
On living Yew leaves.

Sphærieæ.**Chætomium** Kunze.

C. murorum Wint. C.
On decaying grass.

Lasiosphæria C.&DN.

L. spermoides C.&D. M., P.
L. ovina Pers. C., M., W., P.

Melanomma Nitts. Fckl.

M. pulvis-pyrinus (Pers.). M.

Chætosphæria Tul.

C. callimorpha (Mont.). M.

The preceding four on dead
branches.

Sordarieæ.**Sordaria** C.&DN.

S. decipiens Wint. M.
S. setosa Wint. C.
S. minuta Fckl. C.

On Rabbit dung.

Sporormia DeNot.

S. intermedia. C.
S. minima. C.

On Rabbit dung.

Cucurbitarieæ.**Cucurbitaria** Gray.

C. elongata Grev. C., M.
On *Rosa* stems.

XYLARIACEÆ.**Hypoxylon** Bull.

H. rubiginosum F. M.
On wood.

Daldinia C.&DN.

D. concentrica (Bolton). P.
On wood.

Poronia Willd.

P. leporina Ellis & Everh. C.
On rabbit dung.

Xylaria Hill.

X. polymorpha Grev. P.
On decaying stump.

X. hypoxylon Linn.

Extremely common on dead wood.

VALSACEÆ.**Eutypa** Tul.

E. lata Tul. C., M., P.

HYPOCREACEÆ.**Sphæroderma** Fckl.

S. giganteum Massee & Crossland. C.
On decaying grass.

Nectria Fr.

N. cinnabarina Fries. M., W., P.

Calonectria DeNot.

C. funicola B. & Br. C.

Hypocrea Fries.

H. rufa Fr. C., W.

All on dead branches.

Hypomyces Fries.

H. rosellus Tul. M.

H. ochracea Tul.

Both on *Polyporus betulinus*. M.

HYSTERIACEÆ.**Dichæna** Fr.

D. quercina (Pers.). M., P.
On dead Oak wood.

Hysterium Tode.

H. virgultorum DC. C.

(DISCOMYCETÆ.)**PEZIZACEÆ.****Humaria** Fries.

H. melaloma (Fckl.) Mass. C.

On charred ground.

H. granulosa (Bull.) Sacc. M., W.

On cow dung.

H. hepatica Sacc. P.

Among moss and hepatics on old
stump.

Lachnea Fries.

L. scutellata (L.) Gill.

On dead wood.

Helotium Fries.

H. ferrugineum (Schm.) Fr. M., S.

H. pallescens Fr. P.

H. lutescens (Hedw.) Fr. M.

H. salicellum Fr. M.

H. virgultorum (Vahl.) Karst. P., S.

All on decayed branches.

H. cyathoides (Bull.) Karst.

C., M., P.

On decaying herb stem.

H. renisporum Ellis. P.

On petioles and veins of dead oak leaves.

H. tumidulum (Rehm).

On under side of decaying oak leaves, Conisborough.

H. fagineum (Pers.) Fr.

On beech mast.

Cyathicula DeNot.

C. coronata Bull. M.

On decaying herb stem.

Chlorosplenium Fries.

C. æruginosum CEd. M., P.

On dead branches.

Mollisia Fr.

M. atrata (Pers.) Karst. C., M.

M. cinerea (Batsch.) Karst.

C., M., W.

M. melaleuca (Fr.) Sacc. P.

On chips and branches.

Dasyscypha Fries.

D. virginea (Batsch.) Fekl. M., P.

D. nivea (Hedw.) Mass. M., P.

D. calycina (Schum.) Fekl. M.

On fallen larch branch.

Belonidium M. & D.

B. pruinatum (Jerd.) Mass. P.

On *Eutypa lata*.

ASCOBOLACEÆ.

Ascophanus Boud.

A. carneus Pers. M., P.

A. equinus (Müll.) Mass.

C., M., W., P.

A. ochraceus Crouan. C.

All on both cow and horse dung.

Ascobolus Pers.

A. vinosus Berk. C.

On rabbit dung.

A. glaber Pers. P.

A. furfuraceus Pers. C., M., W., P.

A. immersus Pers. C., M.

Last three on cow dung.

Saccobolus Boud.

S. neglectus Boud. C.

On rabbit dung.

BULGARIACEÆ.

Coryne Tul.

C. sarcoides (Jacq.). M., P.

Orbilia Fries.

O. leucostigma Fr. P.

Both on wood.

PHACIDIACEÆ.

Trochila Fries.

T. ilicis (Fr.) Crouan. M., C., P.

On dead Holly leaves.

Rhytisma Fr.

R. acerinum Pers. M.

On Sycamore leaves.

GYMNOASCACEÆ.

Arachniotus Schrœt.

A. ruber Sch. C.

On rabbit dung.

PHYCOMYCETÆ.

MUCORACEÆ.

Mucoræ.

Mucor Mich.

M. mucedo L. C., M.

On dung.

Spinellus V. Teigh.

S. fusiger V.T. C., M.

On agarics.

Sporodinia Schrœt.

S. aspergillus Schrœt. C., M., P.

On living agarics.

Pilaira V. Teigh.

P. anomala Schr. C.

On rabbit dung.

Pilobolus Tode.

P. crystallinus Tode.

Common on cow dung.

Chætocladiæ.

Chætocladium Fries.

C. Jonesii Fr. C.

On rabbit dung.

Piptocephalidæ.

Piptocephalus DeBary.

P. repens DB. C., M.

On Rabbit dung.

Cystopodaceæ.

Cystopus Lév.

C. candidus Lév. M., P.

On Capsella.

MYXOMYCETÆ.

Physarum Pers.

P. leucophæum Fr. P.

Stemonites Gled.

S. fusca Roth. M., P.

S. typhina Roth. P.

S. Friesiana DeBary. M., P.

Reticularia Bull.

R. lycoperdon Bull. P.

Trichia Hall.

T. varia Rost. P.

Arcyria Hill.

A. punicea Pers. P.

A. incarnata (Pers.) Rost. P.

Lycogala Mich.

L. epidendron (Bux.) Rest. P.

DEUTEROMYCETÆ.

SPHÆRIOIDACEÆ.

Phyllostictus Pers.

P. primulicola Desm. M.

On leaves of *Primula vulgaris*.

Phoma Fries.

P. nebularis Berk. C.

Asteroma DC.

A. rosæ DC. C.

On garden rose.

Vermicularia Ehrh.

V. trichella Grev. C.

On dead ivy leaves.

HYPHOMYCETÆ.

MUCEDINACEÆ.

Fusidium Link.

F. griseum Link. P.

On dry oak leaves.

Cylindrium Bon.

C. flavo-virens Bon. M.

On fallen oak leaves.

Rhopalomyces Corda.

R. candidus B.&Br. P.

Botryosporium Corda.

B. pulchrum C. M.

On decaying herb stem.

Cephalosporium Corda.

C. acrimonium C. C.

On dead stem of *Heracleum*.

Penicillium Link.

P. glaucum Link. C.

On decaying *Fistulina*.

P. candidum Link. M.

Botrytis Mich.

B. vulgaris Fr. C., M., W.

Common on herb stems.

Sepedonium Link.

S. chrysospermum. M., W.

Diplosporium Bon.

D. album Bon. C.

On decaying herb stem.

Diplocladium Bon.

D. macrosporium (Fr.) Mass. M.

Trichothecium Link.

T. roseum Link. P.

On twigs.

Ramularia Unger.

R. calcea Cer. P.

On ground-ivy.

DEMATIACEÆ.

Torula Pers.

T. monilioides Corda. P.

On dead branches.

T. herbarum Link.

On dead *Heracleum* stem.

Echinobotryum Corda.

E. atrum Corda.

Parasitic on *Pilaira* on rabbit dung.

Trichosporium Fries.

T. fuscum Sacc. P.

STILBACEÆ.

Stilbum Tode.

S. tomentosum Schr. M.

Parasitic on *Trichia*.

S. erythrocephalum Dittm. M.

On wood-pigeon dung.

S. fimetarium B.&Br.

Extremely common on rabbit dung.

S. leiopus Ehrh.

On wood-mouse dung.

Scabba Wood.

S. melleum B.&Br. P.

On wood.

Sporocybe Sacc. M.

S. Phillipsii B.&L.

TUBERCULARIACEÆ.

Ægerita Pers.

Æ. candida P. P.

Volutella Tode.

V. ciliata (Fr.). M.

NOTE on LINCOLNSHIRE FUNGI.

Some Fungi at Woodhall Spa, Lincs.—During a visit to Woodhall Spa, Div. 10, in October, I noticed a great variety of Fungi growing in the Pine and Birch Woods, near the Bath House; I sent a few of the most noticeable to the Rev. W. Fowler, who very kindly named for me the first twenty species in the following list:—

Amanitopsis vaginata, *Amanita rubescens*, and *A. muscaria*; this last abundant in the Birch Woods, its scarlet pileus making quite a glow of colour.

Boletus bovinus, *B. chrysenteron*, *B. sublomentosus*, *B. edulis*, *B. scaber*, and *B. luridus*, all abundant.

Collybia maculata and *C. dryophilus*.

Calocera viscosa, abundant in the Pine Woods.

Lactarius turpis, *L. quietus*, and *L. fuliginosus*.

* *Paxillus involutus*.

Pholiota squarrosa, growing at the base of an ash tree.

Russula alutacea, *R. furcata*, and *R. ochroleuca*.

Coprinus atramentarius and *C. comatus*.

Cyathus vernicosus.

Hypholoma fascicularis, common on old stumps.

Marasmius oreades, frequent in the pastures.

Psalliota campestris, the same.

Tricholoma personatus.

Xylaria hypoxylon, frequent on old stumps.

These are only a very few of the species I saw there; several days' rain rather made work with them, so that I did not gather as many as I hoped to have done.—S. C. STOW, Court Leys, Brandon, Grantham, 24th Oct. 1901.

BOOK NOTICE.

Scharff's History of the European Fauna.—The History of the | European Fauna | By | R. F. Scharff, B.Sc., Ph.D., F.Z.S. | | . . . | With illustrations. | London | Walter Scott, Limited | Paternoster Square | 1899 [8vo. cloth, 364 + viii. pages + advertisements.

We are pleased to be able to unhesitatingly commend this little work as an able and interesting exposition of the views still generally held as to the evolution of the European fauna and flora.

We may select for special remark and approval the dissertation upon the Glacial period, in the course of which is set forth an array of facts and cogent reasons for the probability that the severity of the cold during the Ice age has been unduly exaggerated, and that the climate at that period need not have been widely different from that we at present enjoy to produce all the phenomena of that time.

The aqueous origin of much of the Boulder Clay is successfully advocated by the author, who gives many facts and cites many honoured names in support of his contention.

Dr. Scharff recognises five chief centres of creation from which the European fauna and flora have been derived, which, arranged in the order of their appearance, may be known as Lusitanian, Alpine, Oriental, Arctic, and Siberian, and each of which is considered to have appreciably affected the general character of European life.

We, however, entirely disagree with the author's doctrine of the plurality of life's fountains, and also dissent from the unsatisfactory basis upon which they have been established, and, while freely acknowledging the brilliant acumen and deep research of the learned author, believe that all the phenomena as epitomised in the diagram at p. 117 may be more logically explained by evolution within or near the Germanic area from whence the improved and more dominant types have gradually spread, driving further and further afield the earlier and weaker forms.

The work, however, in its entirety is one that can heartily be commended to our readers, not only for the wealth of facts attractively set forth, but for the general erudition and literary excellence for which the doctor is noted.

NOTES on YORKSHIRE BIRDS.

Occurrences of Uncommon Migrant Birds at Spurn.—A fine Bluethroat (*Cyanecula suecica*?), a male, I should think, was seen here on the 10th of September. A nice lot of Siskins (*Chrysomitris spinus*) were seen about here on the 14th September, and a ♂ Great Spotted Woodpecker (*Dendrocopus major*) on 25th September. A Common Buzzard (*Buteo buteo*) was shot near Easington on the 23rd of September, and a Short-eared Owl (*Asio brachyotus*) on 20th September.—PHILIP W. LOTEN, Easington, 12th October 1901.

Kingfisher Breeding at Huddersfield.—Two pairs of Kingfishers (*Alcedo ispida*) have bred (the nests being known) in this immediate district during the past season, and probably others also nested in the district. In one case the nest was disturbed just as the young were fully feathered, but as they all flew out of the nest, it may reasonably be hoped they were none the worse for their premature dispersal from home. The species has again several times visited the ponds in my own grounds this year, and on one occasion two were seen there together.—GEO. T. PORRITT, Crosland Hall, near Huddersfield, 19th September 1901.

'Curious Site for a Thrush's Nest' at Netherton Station.—It is, I think, worth placing on record that the pair of Thrushes (or presumably the same pair) which built their nest and reared their young in such a curious place at Netherton Railway Station, near Huddersfield, in 1900 (see 'Naturalist,' 1900, pp. 164 and 240), returned to exactly the same spot in the spring of this year. On 1st April I noticed them busy building their nest, and by the 10th they were sitting keenly on their eggs, taking no notice either of the trains or numerous passengers, with all the attendant noise and commotion; nor at night of the bright light from the large lamp close beside them. Thanks to the protection afforded by the station master and his assistants, I believe the young again all got safely away; but the parent Thrushes did not—as I rather expected they would—rear their second brood on the same site.—GEO. T. PORRITT, Crosland Hall, Netherton, Huddersfield, 25th October 1901.

Green Woodpecker Nesting in Harewood Park.—I was fortunate in meeting with the above bird in Harewood Park on the 8th of June this year. My attention was arrested by seeing some new chippings at the foot of a large Ash tree, and while examining them a further shower came down. On looking up I discovered a hole fully 50 feet up, and, on casting a stone, out flew a bird about the size of a Jay, which I had no difficulty in identifying as a Green Woodpecker (*Gecinus viridis*). It soon confirmed this by uttering its peculiar laughing cry, which strongly resembled the laugh of a hysterical female. This it repeated on several occasions and came back several times while I was in the vicinity. I paid a visit two weeks later with my climbers and a rope, and, although I got partly up the tree, the bend was at such an angle that I had to give up the attempt to reach the nest, much as I should have liked to see it.—THOS. RAINE, Woodland View, Chapel-Allerton, 25th September 1901.

NOTES and NEWS.

We understand from Mr. H. Wallis Kew that since the publication of his paper on 'Lincolnshire Pseudoscorpions: with an Account of the Association of such Animals with other Arthropods,' in the July 'Naturalist,' he has received several items of additional information, and that he is engaged upon a supplementary paper, which will be offered to this journal in due time. We hope those of our readers who have seen Chelifers on Flies' legs, or other similar associations, will communicate their observations to Mr. Kew, who may be addressed at 157, Ferme Park Road, Hornsey, London, N.



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